REMARKS

Claims 1-3, 5-6, 11-19, 21, 26-31, 34-36, and 41-45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang. Similarly, claims 3-5, 11-14, 18-20, 26-29, 33-35, and 41-44 stand unpatentable over Wang for reasons set forth in the May 28, 2002 Office Action. Reconsideration is respectfully requested.

Wang does not teach or suggest Applicants' claimed invention. Wang "provides a method for <u>reducing</u> the gate aspect ratio of a flash memory device." (Col. 2, lines 24-25) (emphasis added). The "[g]ate aspect ratio refers to the ratio of the <u>height</u> of the stack structures A and the distance between the stack structures of adjacent cells B." (Col. 1, lines 31-34) (emphasis added).

Applicants' claimed invention is directed toward fabricating a top oxide layer in an oxide-nitride-oxide (ONO) structure with an <u>actual</u> thickness of at least about 60% of the targeted thickness. Conventionally, attempting to grow a top oxide layer of about 80 Å resulted in a layer <u>only</u> .8 Å thick (Applicants' specification, pgs. 6-7). Further, to grow a thick top oxide layer, the process would take long periods of time. Wang merely teaches a <u>conventionally-formed</u> ONO structure.

Wang's dielectric layer 410 comprises a first oxide layer 50 Å thick, a nitride layer 80 Å thick, and a second oxide layer 50 Å thick (Col. 3, lines 39-54 and FIG. 4D). Wang teaches that the "second of the two oxide layers of the dielectric layer 410 is formed using a <u>nitride oxidation</u> technique at about <u>950°C</u>, with about 5 liters of O_2, and 9 liters of H_2, <u>for about 40 minutes</u>." (Col. 3, lines 49-52) (emphasis added). Wang's <u>final</u> ONO structure is <u>only</u> 135 Å thick (Col. 3, lines 53-54).

Wang's first oxide layer and nitride layer are a <u>combined</u> 130 Å thick. The second oxide layer in Wang has a targeted thickness of 50 Å, but, results in an <u>actual</u> thickness of 5 Å, since Wang teaches an ONO structure that is in <u>total</u>, <u>only</u> 135 Å thick.

Thus, Wang's top oxide layer's resulting thickness is only 10% of the targeted 50 Å, e.g., 5 Å. Applicants' novel method allows one to achieve a top oxide layer that is actually 48 Å thick, e.g., 60% of a targeted value of 80 Å (Applicants' specification, pgs. 12-13). Applicants' final ONO structure is 178 Å thick: a first oxide layer 50 Å thick, a nitride layer 80 Å thick, and a second oxide layer 48 Å thick. (Applicants' specification, pgs. 12-13).

Moreover, Applicants teach a top oxide layer 46c "grown at a temperature of about 850°C to about 1100°C, preferably at a temperature less than about 900°C, for about 1 second to about 10 minutes, using a gas ambient containing atomic oxygen." (Applicants' specification, pg. 12) (emphasis added). Wang teaches an oxidation time of 40 minutes and a temperature of 950°C. In fact, Wang does not even teach or suggest using atomic oxygen.

Further, if Wang teaches or suggests Applicants' claimed invention, which it does not, the idea of providing a thicker ONO structure would be contrary to the problem that Wang is trying to solve. Specifically, providing a method for reducing the gate aspect ratio of a flash memory device. A thicker ONO structure would increase the gate aspect ratio of a flash memory device rather than decrease it.

Accordingly, Wang does not teach or suggest that the "second oxide layer is formed by oxidizing said nitride layer with an ambient containing atomic oxygen for about 1 second to about 10 minutes," as claim 1 recites, nor a "second oxide layer [that] is formed to at least 60% of a targeted thickness of said second oxide layer," as claim 16 recites, or a "second oxide layer [that] is formed by oxidizing said nitride layer in the presence of atomic oxygen at a temperature of less than about 900°C," as claim 31 recites.

In addition, the limitation regarding that the second oxide layer is formed to at least 60% of a targeted thickness as claims 5, 16, and 35 recite, is not purely arbitrary as the Office Action asserts. Applicants' specifically teach that if an 80 Å thick second oxide layer is desired, at least a 48 Å thick layer will result (Applicants' specification, pgs. 12-13).

Applicants further provide the time, temperature, and atmosphere needed to obtain at least 60% of a targeted thickness of the top oxide layer. These are additional reasons that claims 5, 16, and 35 are allowable over the cited reference.

Claims 2-6, and 11-15 depend from and incorporate all of the limitations found in independent claim 1, claims 17-21, and 26-30 depend from and incorporate all of the limitations found in independent claim 16, and claims 33-36 and 41-45 depend from and incorporate all of the limitations found in independent claim 31. These claims are at least allowable for the reasons set forth above regarding independent claims 1, 16, and 31.

Therefore, the rejection for claims 1-3, 5-6, 11-19, 21, 26-31, 34-36, and 41-45 should be withdrawn.

Claims 7-10, 22-25, and 37-40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Neely as applied in the May 28, 2002 Office Action. Reconsideration is respectfully requested.

Claims 7-10 depend from and incorporate all of the limitations found in independent claim 1, claims 22-25 depend from and incorporate all of the limitations found in independent claim 16, and claims 37-40 depend from and incorporate all of the limitations found in independent claim 31. These claims are at least allowable for the reasons set forth above regarding independent claims 1, 16, and 31 in view of Wang.

Neely is relied upon for another feature and adds nothing to rectify the deficiencies found in Wang. Neely is relied upon for teaching decomposing ozone under the presence of microwaves in order to promote oxidation. The Office Action asserts that it would be obvious to form the second oxide layer in Wang using the process taught by Neely to reduce the thermal budget of the oxidation in Wang. Applicants respectfully disagree.

The combination of Wang and Neely is improper. There is no teaching or suggestion in Wang that a low thermal budget oxidation process is needed. In fact, all of the temperatures in Wang are conducted at high temperatures. Wang <u>requires</u> "an anneal [which] is performed on the nickel film at about 600°C, which <u>causes</u> the nickel film to react with the second polysilicon layer 412, forming a layer of nickel silicide 414." (Col. 4, lines 3-5).

Conversely, Neely teaches that high temperatures such as those "greater than 600° – 700° C.," resulted in imperfect silica films (Col. 2, lines 25-35). Wang's resulting second polysilicon layer 412 and nickel silicide layer 414 provide the shorter gate aspect ratio. A temperature of at least 600°C is required in Wang to react the nickel film with the second polysilicon layer 412. Accordingly, the references teach that they are inherently non-combinable. Therefore, the rejection for claims 7-10, 22-25, and 37-40 should be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

By____________________

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